## REMARKS

Claims 1-59, 84, 88, and 91-93 were previously cancelled. Claims 60-83, 85-87, 89, 90, and 94-99 are pending in the present application.

Claims 60-72 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fan et al. (U.S. Patent 6,171,833) ("Fan") in view of Akio (U.S. Patent 5,691,548) ("Akio"), Osawa et al. (U.S. Patent 6,071,443) ("Osawa") and Fossum (U.S. Patent 5,887,049) ("Fossum"), a total of four references. Applicant respectfully traverses this rejection.

Claim 60 recites a "method of forming a microlens array for use in an imaging device" by *inter alia* "forming a radiation transparent insulation layer on said microlens array for increasing the proportion of radiation incident on said pixel sensor cells by *extending the light-capturing capabilities beyond a periphery area surrounding each individual microlens* of said microlens array, wherein said insulation layer *includes silicon insulator material.*" (Emphasis added). Neither Fan nor any of the other prior art cited in the Office Action discloses or suggests the insulation layer of claim 60.

Fan refers to an image array device (Fig. 2) that has patterned microlenses 24 and an encapsulant layer 25. (Col. 7, lines 1-10; col. 8, lines 45-56). The encapsulant layer 25 in the Fan device is formed of almost any material "to a thickness of about 1000 angstroms" (col. 10, lines 18-20) or "as thin as practicable while still providing desirable functionality conformally encapsulating exposed surfaces of the series of patterned microlens layers" (col. 8, lines 60-63). The encapsulant layer 25 is subsequently thermally annealed and photochemically cured. (Col. 10, lines 20-25). The crux of the Fan patent is enhanced optical stability. The encapsulant layer of Fan merely "inhibits optical degradation of the patterned microlens layer." (Col. 3, lines 8-9).

While Fan does teach an insulation layer 25, its purpose is to inhibit optical degradation of the microlens layer beneath it and may be arbitrarily deposited by any

method, including chemical vapor deposition methods, plasma enhanced chemical vapor deposition methods, physical vapor deposition methods and spin coating methods. (Col. 8, lines 50-56). The only limitation to the Fan insulation layer 25 is that it is *as thin as practicable* and that it has an index of refraction less than that of the microlens layers 24a, 24b, 24c and 24d. (Col. 9, lines 1-6).

Contrary to the Office Action, which states that the disclosed processes of Fan "would obtain the recited results of claim 60 because the same materials are treated in the same manner as in the instant invention" (page 3), the step of making the insulation layer 25 of Fan *is not the same* as the step of forming the radiation transparent layer 72 of the present invention. Fan does not teach or suggest that the light-capturing capabilities of insulation layer 25 is extended beyond a periphery area surrounding each microlens. In fact, the Fan insulation layer 25 being formed "as thin as practicable" would appear to teach away from the insulation layer 72 of the claimed invention (which is formed such that it captures more incident light from beyond the periphery of the lens). Moreover, there is no description in the Fan specification stating that there is necessarily a space between the lenses, which would be a required feature in order for a periphery area to exist. Thus, Fan does not teach or suggest a periphery area, much less "extending the light-capturing capabilities beyond a periphery area," as recited in claim 60.

The Office Action also states that Fan teaches that "the insulation layer includes silicon insulator material such as silicon nitride." (Office Action at 3). However, it is the *blanket passivation layer 16* (formed *under* the lens array of Fan), and not the encapsulant layer 25 (formed *over* the lens array of Fan), that is a silicon nitride material (col. 7, lines 42-43). Thus, Fan is entirely silent on "forming a radiation transparent insulation layer on said microlens for increasing the proportion of radiation incident on said pixel sensor cells . . ., wherein said insulation layer includes silicon insulator material," as recited in claim 60.

The Office Action offers the disclosure of Scholz et al. (U.S. Patent 5,997,6210) ("Scholz") as evidence that an insulation layer consisting of silicon dioxide has an index of

refraction of 1.2 to 1.4. However, Scholz relates to coating compositions that are "particularly useful in the manufacture of disposable surgical masks and face shields" (Abstract) and provides teachings for a field of art different from that of Fan. Thus, one ordinarily skilled in the art would not have been motivated to combine Scholz with Fan. Moreover, it is not evident how a teaching of using silicon dioxide to manufacture surgical masks would have any applicability to Fan's imaging device, or how or why one skilled in the art of imaging devices would find any motivation in Scholz or Fan to use its Scholz's teachings in Fan or in an imaging device.

Even assuming, arguendo, that the teachings of Scholz could be combined with Fan, a silicon dioxide layer suggested by Scholz formed over the microlens of Fan does not teach or suggest forming a layer capable of "extending the light-capturing capabilities beyond a periphery area surrounding each individual microlens," as in the claimed invention.

Akio, Osawa, and Fossum cannot supplement the inadequacy of Fan in this regard. Akio relates to a solid state imaging device having an "insulating film 42, a transfer electrode 43, a light shielding film 4, a protective film 45, and a flat layer 51" formed above "a layer having a photoelectric conversion portion, and a concave lens layer 52." (Abstract). It would not be obvious to one skilled in the art to combine Akio with Fan to obtain the claimed invention as neither Fan nor the claimed invention relate to the use of a concave lens layer.

Even assuming, arguendo, that the teachings of Akio could be combined with Fan, Akio is silent on "a radiation transparent insulation layer on said microlens array" altogether, much less an insulating layer "for increasing the proportion of radiation incident on said pixel sensor cells by extending the light-capturing capabilities beyond a periphery area surrounding each individual microlens . . ., wherein said insulating layer includes silicon insulator material," as recited in claim 60.

Osawa relates to a process for producing a lens sheet including "coating a resin composition for a lens sheet onto a forming die . . ., and superposing a base material on the resin composition for a lens sheet which has been coated onto the forming die." Osawa is also silent on "increasing the proportion of radiation incident on said pixel sensor cells by extending the light-capturing capabilities beyond a periphery area surrounding each individual microlens," as in the claimed invention.

Fossum relates to an image sensor including a pixel array "having photosensitive pixels arranged with respect to one another in a one or two dimensional array," each active pixel including "a light sensing element and one or more active transistors within the pixel itself." (Col. 3, lines 6-13). Fossum is also silent on increasing the proportion of radiation incident on a pixel cells, as in the claimed invention. Fan, Akio, Osawa, and Fossum, whether considered alone or in combination, do not teach "forming a radiation transparent insulation layer on said microlens for increasing the proportion of radiation incident on said pixel sensor cells . . ., wherein said insulation layer includes silicon insulator material," as in the claimed invention. Consequently, claim 60 and depending claims 61-72 should be considered allowable over the prior art of record. Applicant respectfully requests that the 35 U.S.C. § 103(a) rejection of claims 60-72 be withdrawn.

Claims 73-83 and 85-86 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Fan in view of Akio and Osawa. Claims 87, 89, 90, and 94-98 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fan in view of Akio and Fossum. Claim 99 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fan in view of Akio. Applicant respectfully traverses these rejections.

Independent claims 73, 87, and 99 have limitations similar to those of claim 60, including, *inter alia*, "depositing a radiation transparent insulation layer on each microlens . . . capturing light from beyond the periphery of each individual microlens . . ., wherein said insulation layer includes silicon insulator material," as recited in claim 73; "forming a radiation transparent insulation layer on each microlens . . . capturing light from beyond

the periphery of each microlens . . ., wherein said insulation layer includes silicon insulator material," as recited in claim 87; and "depositing a radiation transparent insulation layer on the plurality of microlenses for extending the light-capturing capabilities beyond the periphery of each individual microlens . . ., wherein said insulation layer includes silicon insulator material," as recited in claim 99. As such, claims 73, 87, and 99 should be allowable for reasons corresponding to those discussed above in connection with claim 60. Claims 61-72 depend from claim 60; claims 74-83, 85, and 86 depend from claim 73; and claims 89, 90, and 94-98 depend from claim 87. The aforementioned dependent claims should be allowable along with the respective independent claims, and for other reasons.

For at least the above reasons, reconsideration and withdrawal of each of the rejections under 35 U.S.C. § 103(a) are respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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